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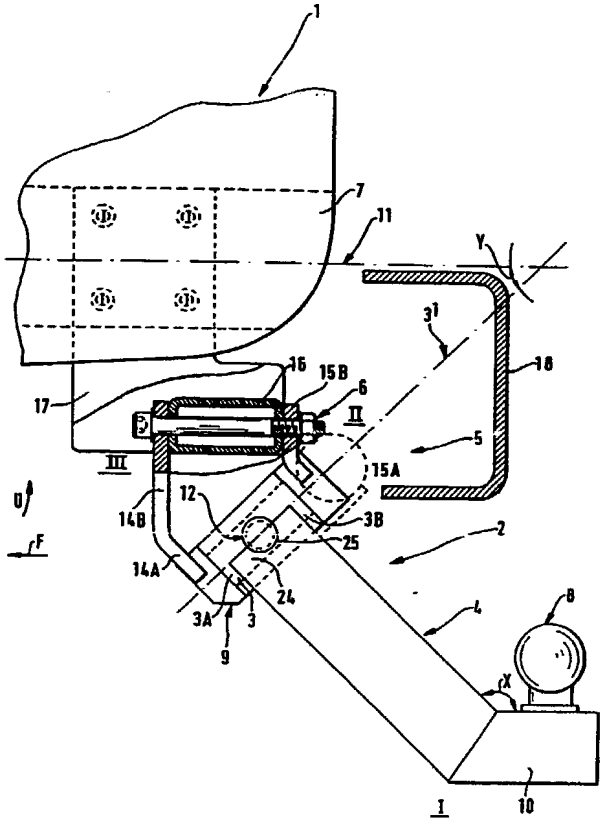
(57) Abstract

The present invention relates to an arrangement (2) on a vehicle (1) to permit the detachable attachment of vehicle trailers or other objects to the vehicle (1) in question in the area of the rear lower part (5) of the vehicle via said towing arrangement (2), which comprises a pivotally mounted towing coupling arm (4) with a coupling device (8) supported at a certain distance from the pivoting mounting (9) of the arm. The invention permits, amongst other things, the use of a towing hitch on a motor vehicle (1) which exhibits high ground clearance, together with the possibility of simply arranging the towing hitch in desired positions where it is readily accessible or concealed without encroaching on the ground clearance of the vehicle. The pivot shaft (3) for said pivoting mounting (9) is arranged at an angle when the towing arrangement (2) is fixed to the vehicle (1). The actuation of said towing coupling arm (4) causing it to pivot about the pivot shaft (3) causes the arm (4) to swing up or to swing down into the desired stowage position (II) or the position (I) ready for coupling to take place.



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Arrangement on a vehicle

The present invention relates to an arrangement on a vehicle to permit the detachable attachment of vehicle trailers or other objects to the vehicle in question in the area of the rear lower part of the vehicle via said towing arrangement, which comprises a pivotally mounted towing coupling arm with a coupling device supported at a certain distance from the pivoting mounting of the arm with the pivot shaft of said pivoting mounting being inclined in a direction away from the lower end of the shaft rearwards and upwards when the towing arrangement is attached to the vehicle.

In the case of motor vehicles, and in particular vehicles of the kind which exhibit high clearance over the ground between the wheels of the vehicle, such as the King-Cab type, etc., it is not desirable to reduce the height of the clearance when it is wished to attach a vehicle trailer of the desired kind to the rear lower part of the vehicle in question with the help of a trailer coupling arrangement, at the same time as which it is wished to achieve a towing hitch which acts at an appropriate height in relation to the vehicle and the trailer, etc. There are certainly trailer coupling arrangements available of a kind such that they are capable of being removed from the motor vehicle on those occasions when the need for the detachable coupling of the motor vehicle to a trailer or caravan, etc., does not arise, and when it is wished to be able to use the motor vehicle with its full ground clearance without the obstruction of any towing coupling arrangement which projects outwards and downwards at the rear lower part of the motor vehicle. However, in order to be sure of having the towing hitch with them at all times, many people are not prepared to disconnect it from the vehicle, with the aforementioned problems as a result.

There are also towing hitches which are capable of being pivoted about a supporting pivot axle extending in the longitudinal sense of the vehicle or a supporting pivot axle extending perpendicularly in relation to the longitudinal sense of the vehicle, although these previously disclosed towing hitches do not exhibit the ability to increase the clearance of the vehicle in relation to the towing hitch, but are instead intended to allow the towing hitch to be moved out of the way, so that they do not project unnecessarily in a direction rearwards from the vehicle and in so doing risk unnecessary damage in the event of an impact at that point.

The principal object of the present invention is thus, in the first place, to make available a towing arrangement of the kind indicated, which, amongst other things, solves the above said problem simply and effectively, and yet without the arrangement being complicated and cost-intensive.

Said object is achieved by means of an arrangement in accordance with the present invention, which is characterized essentially in that the actuation of said towing coupling arm causing it to pivot about the pivot shaft causes the arm to swing up or to swing down into the desired stowage position or the position ready for coupling to take place by the pivot shaft being so inclined that an imaginary prolongation of said pivot shaft subtends an acute angle with a line extending in the longitudinal direction of the vehicle, such that the actuation of said towing coupling arm causing it to pivot about the inclined pivot shaft causes the arm and its associated coupling device to swing up into a desired stowage position with the arm extending across the longitudinal direction of the vehicle, or causes the arm and its associated coupling device to swing down into an intended towing position ready for coupling to take place, with the arm extending at an angle downwards and rearwards from the rear of the vehicle in the area of the central rear part of the vehicle.

The invention is described below as a preferred illustrative embodiment, in conjunction with which reference is made to the drawings, in which:

Fig. 1 shows a side view of a rear part of a motor vehicle which has a towing arrangement in accordance with the invention fitted and illustrated in the extended position ready for coupling to take place;

Fig. 2 shows a detailed sectional view of the arrangement;

Fig. 3 shows a perspective view of the towing arrangement not installed on a vehicle and illustrated pivoted into different positions;

Fig. 4 shows a perspective view of the towing arrangement not installed on a vehicle and illustrated in the extended position ready for coupling to take place;

Fig. 5 shows a perspective view of the towing arrangement not installed on a vehicle and illustrated in the extended position ready for coupling to take place viewed from below; and

Fig. 6 shows a perspective view of the towing arrangement in the upward-pivoted stowage position.

A towing arrangement 2 in accordance with the present invention intended for the detachable attachment of trailers, caravans, vehicle trailers of other kinds or objects such as bicycle racks, for example, to a motor vehicle 1 comprises an inclined pivot shaft 3, about which an intended towing coupling arm 4 is so arranged as to be capable of being caused to pivot. The arrangement 2, which is capable of attachment for example to a vehicle 1 in the area of the rear lower part 5 of the vehicle, for example by means of bolts 6 which are attached either directly or indirectly to the standard chassis rails 7 of the vehicle, comprises a coupling device 8, for example a ball, which is supported at a certain distance from the pivoting bearing 9 of the arm. Said coupling device 8 is supported so that it is accessible from above when the arrangement 2 is being held in the position I ready for coupling to take place, as

shown in Fig. 2, for example, with the coupling ball 8, etc., supported on the outer free end 10 of a coupling arm 4. Said arm 4 appropriately extends at an angle X, such that the outer end part 10 of the arm 4 extends essentially parallel with a line 11 extending in the longitudinal direction of the vehicle, for example along an existing longitudinal chassis rail 7 of the vehicle, running down the centre of the vehicle.

The pivot shaft 3 of said pivoting bearing 9 is preferably inclined rearwards and upwards, viewed in a direction away from the lower end 3A of the shaft, such that an imaginary prolongation 3^1 of said shaft 3 preferably subtends an acute angle Y with a line 11 extending in the longitudinal direction of the vehicle.

The function and the nature of the towing arrangement 2 are such that, for example when said towing coupling arm 4 is actuated manually causing it to pivot about the inclined pivot shaft 3, the arm 4 and its associated coupling device 8 are caused to swing up into an intended stowage position II, as indicated by the broken lines in Figs. 2 and 3, with the arm 4 extending across the longitudinal direction of the vehicle, or the arm 4 and its associated coupling device 8 are caused to swing down into a desired intended towing position I ready for coupling to take place, with the arm 4 extending obliquely downwards and rearwards from the rear end 5 of the vehicle in the area of the central rear part of the vehicle.

The arrangement 2 should suitably be provided with a catch 12 of an appropriate kind, with which the arm 4 can interact and be locked in a desired set position, for example the two said positions I and II. Said catch 12, which can be so arranged as to act upon the pivot shaft 3, and as to be capable of manual actuation, may consist of a pin or a ball, for example, so arranged, when in the intended locking position, as to interact with the associated bearing 9 for the shaft, in so doing retaining the arm 4 in the desired positions I and II. Said catch 12

may be spring actuated and arranged either so as to operate under the effect of spring force, or so as to be released with the assistance of the spring force.

The mounting brackets 13 for the towing coupling arm 4 are supported by the bearing 9 at its two ends 9A, 9B, and the brackets preferably consist of pairs of uprights 14, 15 which are so arranged as to be capable of detachable attachment to a vehicle chassis rail, for example to a cross-rail 16 which is supported by and is attached to a vehicle box girder 7 with the help of mounting plates 17 beneath the vehicle 1 and inboard of the rear bumper bar 18 of the vehicle.

The two mounting uprights 14, 15 may consist of pieces of flat angled plate which exhibit bolt fixing holes 19 at the top, such that the arrangement 2 is secured rigidly to a vehicle 1. The mounting uprights 14, 15 can extend from a bearing 9 of the kind in question in a position III fixed to a vehicle 1 obliquely upwards U and forwards F in the longitudinal and vertical directions of the vehicle, with various parts 14A, 14B; 15A, 15 B of the upright, and the fixing bolts 6 can be so arranged as to interact with upward-facing parts 14B, 15B of the uprights for the purpose of fixing the arrangement 2 with bolts to a rail 16 of the kind referred to above.

The function of the arrangement 2 should have become apparent from the foregoing, although it can be stated briefly that the arm can be locked in its rearward-swung position I ready for coupling to take place by means of the catch 12 and prevented from pivoting away from said position I unintentionally. The arm 4 with its associated coupling device 8, when in said position I, is then at a suitable distance N above the ground 20, with a free angle Z of about 15° viewed from the rear wheel 21 of the vehicle which is in contact with the ground 20. The lower part 10 of the arm is then at a certain distance H from the bearing 9 when viewed in the vertical sense. In the upward pivoted position II, with the arm 4 angled to the side beneath the

vehicle 1 inboard of the bumper bar 18, the outer part of the arm, and thus also its lower end 10, are at the same level 23 as the bearing 9 with a free angle W amounting in total to ca. 25° when viewed as stated above.

It must also be noted that said simple measure of causing the arm 4 to pivot achieves not only the raising of the arm 4 and the coupling ball 8, etc., over the distance H to the intended desired adjustable levels 22 or 23, retracted II out of the way close to the underneath of the vehicle or lowered I into a position at the correct level for the coupling and towing of a load, or alternatively for detachable attachment to intended objects, for example a bicycle rack of the previously disclosed kind which is attached to a towing coupling ball 8, but also its extension beyond the rear end part 5 of the vehicle and its retraction within the rear boundary line of the vehicle, for a distance L, by which distance L the effective length of the vehicle can be varied in a direction from the towing hitch mounting depending on the positions I or II to which the towing hook has been caused to pivot.

The arrangement 2 is equally suitable for fitment as original equipment to new vehicles, and for fitment as an accessory to vehicles which are already in service.

Pivoting of the arm 4 about the shaft 3, which is preferably securely attached to both end parts 9A, 9B of the bearing, to which the mounting uprights 14, 15 are securely attached, means, for example, that the bearing hub part 24 of the arm, which exhibits a shaft accommodating hole 25, is caused to pivot together with the associated arm 4 and the coupling ball 8, etc., about the shaft 3 in the direction of the arrow 26 after releasing the catch 12.

The invention is not restricted to the illustrative embodiment of the arrangement described above and shown in the drawings, but may be modified within the scope of the Patent Claims without departing from the idea of invention.

Patent Claims

1. Arrangement (2) on a vehicle (1) to permit the detachable attachment of vehicle trailers or other objects to the vehicle (1) in question in the area of the rear lower part (5) of the vehicle via said towing arrangement (2), which comprises a pivotally mounted towing coupling arm (4) with a coupling device (8) supported at a certain distance from the pivoting mounting (9) of the arm with the pivot shaft (3) of said pivoting mounting (9) being inclined in a direction away from the lower end (3A) of the shaft rearwards and upwards when the towing arrangement (2) is attached to the vehicle (1), ***characterized in that*** the actuation of said towing coupling arm (4) causing it to pivot about the pivot shaft (3) causes the arm (4) to swing up or to swing down into the desired stowage position (II) or the position (I) ready for coupling to take place by the pivot shaft (3) being so inclined that an imaginary prolongation (3^1) of said pivot shaft (3) subtends an acute angle (Y) with a line (11) extending in the longitudinal direction of the vehicle, such that the actuation of said towing coupling arm (4) causing it to pivot about the inclined pivot shaft (3) causes the arm (4) and its associated coupling device (8) to swing up into a desired stowage position (II) (as indicated by the broken lines in Figs. 2 and 3) with the arm (4) extending across the longitudinal direction of the vehicle, or causes the arm (4) and its associated coupling device (8) to swing down into an intended towing position (I) ready for coupling to take place, with the arm (4) extending obliquely downwards and rearwards from the rear end (5) of the vehicle in the area of the central rear part of the vehicle.

2. Arrangement in accordance with Patent Claim 1, ***characterized in that*** the towing coupling arm (4) extends

at an angle (X), in conjunction with which the coupling device (8) is supported so that it is accessible from above in a position on the arm (4) ready for coupling to take place at the outer free end (10) of the arm.

3. Arrangement in accordance with Patent Claim 2, ***characterized in that*** the coupling device (8) is in the form of a ball.

4. Arrangement in accordance with any of the foregoing Patent Claims, ***characterized in that*** a catch (12) is capable of interacting with the towing arrangement (2) for the purpose of locking the arm (4) in the desired set position (I; II).

5. Arrangement in accordance with Patent Claim 4, ***characterized in that*** the catch (12) is so arranged as to act upon the pivot shaft (3).

6. Arrangement in accordance with Patent Claim 5, ***characterized in that*** the catch (12), which is capable of manual actuation and which, for example, is in the form of a pin or a ball, is so arranged when in the locked position as to retain the arm (4) and to act between the shaft and an arm bearing component (24).

7. Arrangement in accordance with any of the foregoing Patent Claims, ***characterized in that*** the arm (4) with its associated coupling device (8), when in the rearward-pivoted position (I) ready for coupling to take place, is at a suitable distance (N) above the ground (20).

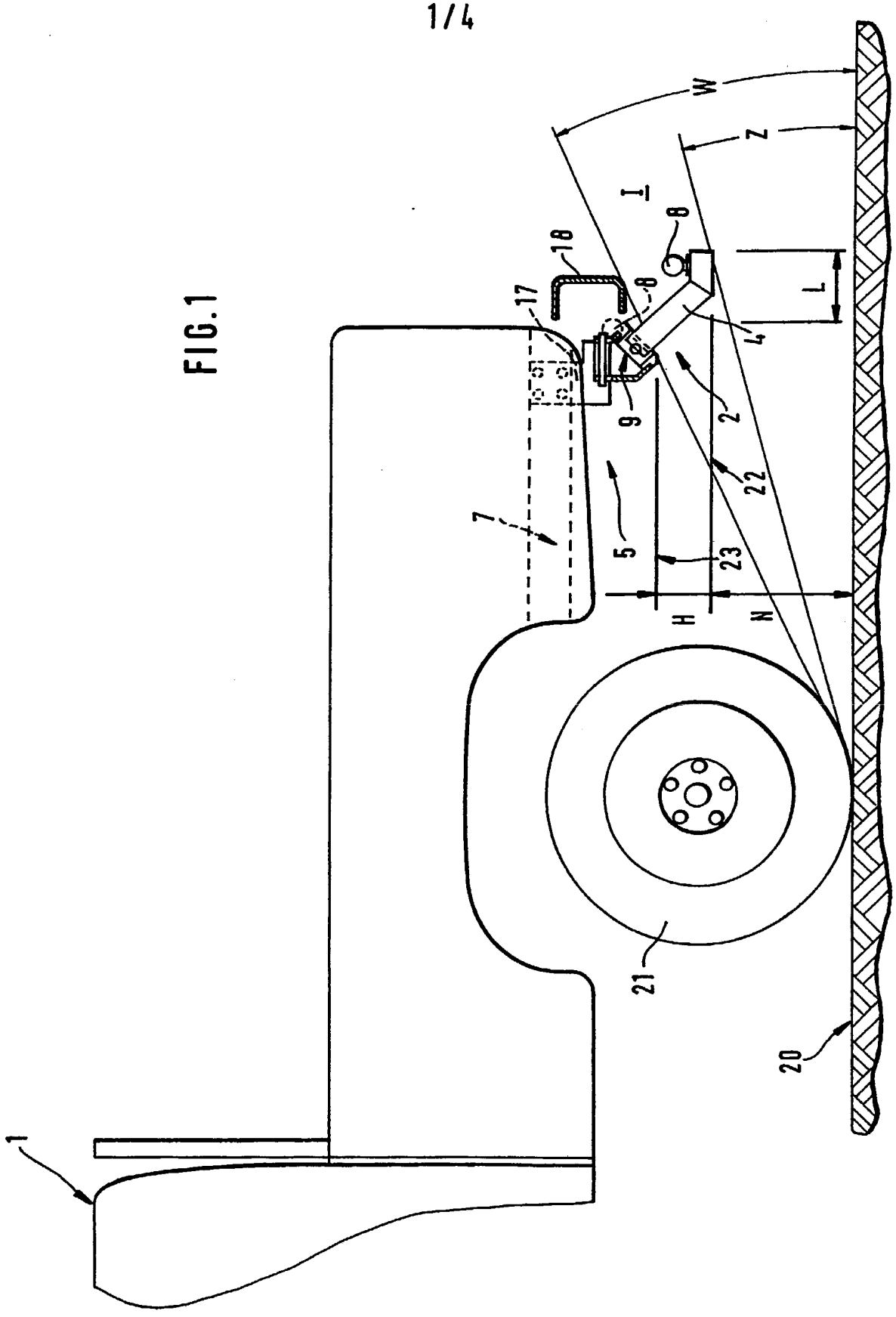
8. Arrangement in accordance with Patent Claim 7, ***characterized in that***, when in the upward-pivoted position (II) with the arm (4) angled to the side beneath the vehicle (1) inboard of the bumper bar (18), the outer end of the arm, and thus also its lower end (10), is at the same level (23) as the bearing (9).

9. Arrangement in accordance with any of the foregoing Patent Claims, ***characterized in that*** the mounting brackets (14, 15) for the arm (4) are supported at the respective ends (9A, 9B) of the bearing, and are preferably in the form of uprights (14, 15) capable of attachment to

a vehicle chassis rail (7; 16), in conjunction with which the shaft (3) is securely attached to both end parts (9A, 9B) of the bearing, to which the mounting bracket uprights (14, 15) are securely attached.

10. Arrangement in accordance with Patent Claim 9, ***characterized in that*** said mounting bracket uprights (14, 15) are angled in such a way as to extend away from the bearing (9) forwards (F) and upwards (U) with various parts (14A, 14B; 15A, 15B) of the uprights, in conjunction with which, for example, fixing bolts (6) are so arranged as to interact with the upward-facing parts (14B; 15B) of the uprights for the purpose of bolting them securely to a vehicle chassis rail (16) extending across the longitudinal direction of the vehicle.

FIG.1



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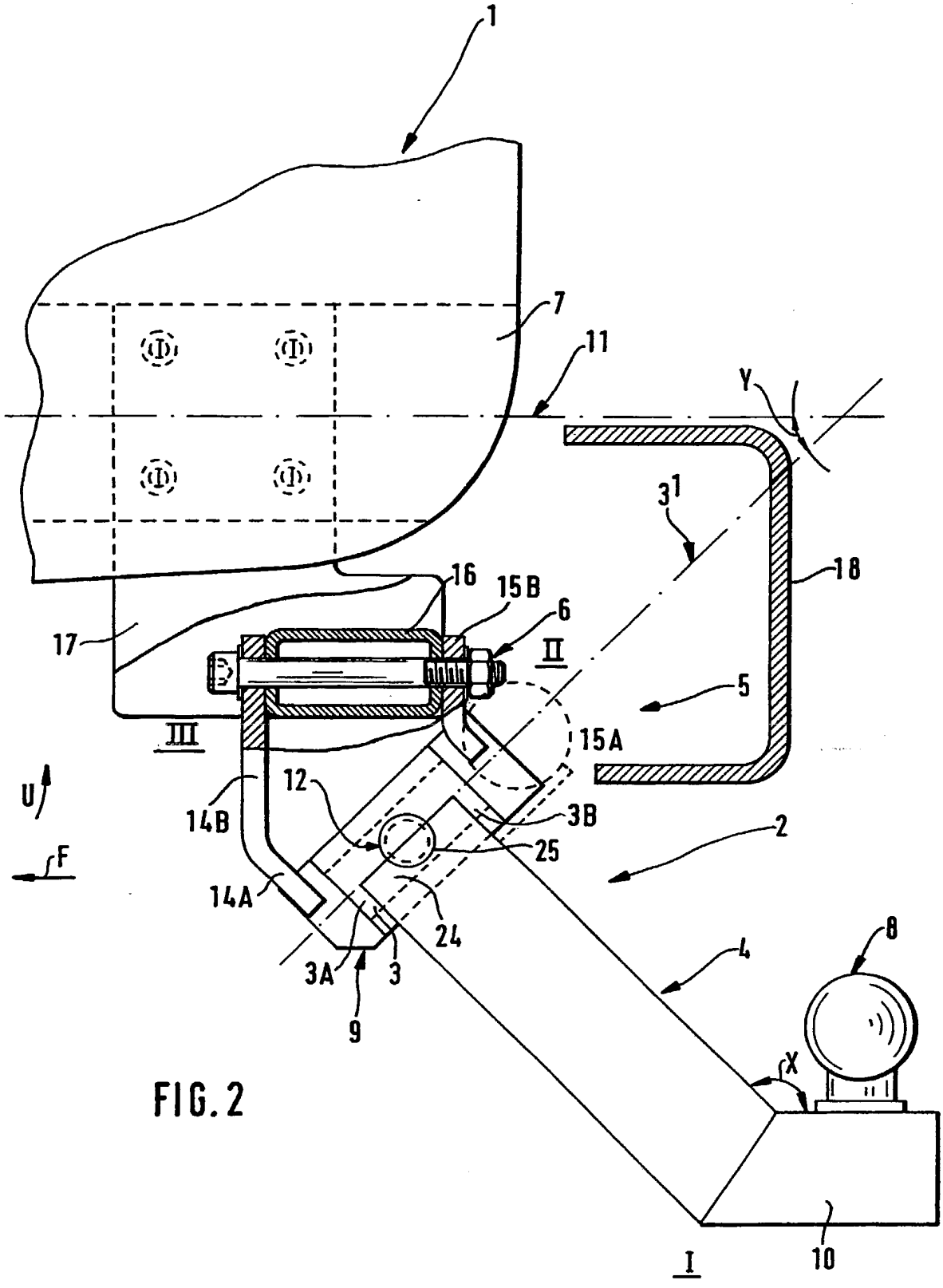
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FIG. 2

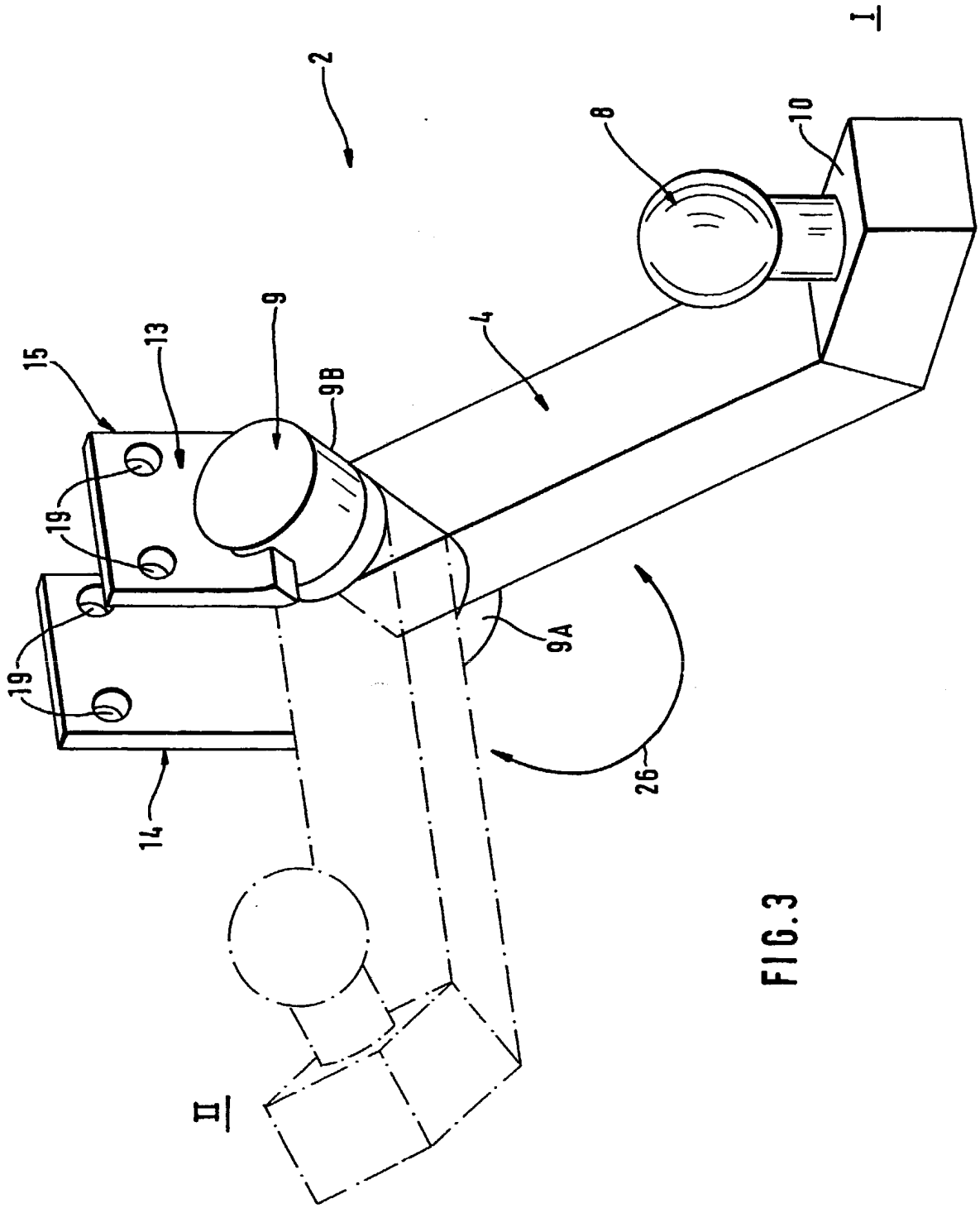

FIG.3

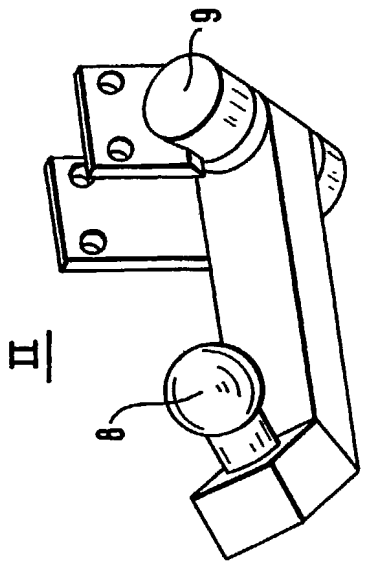

FIG.6

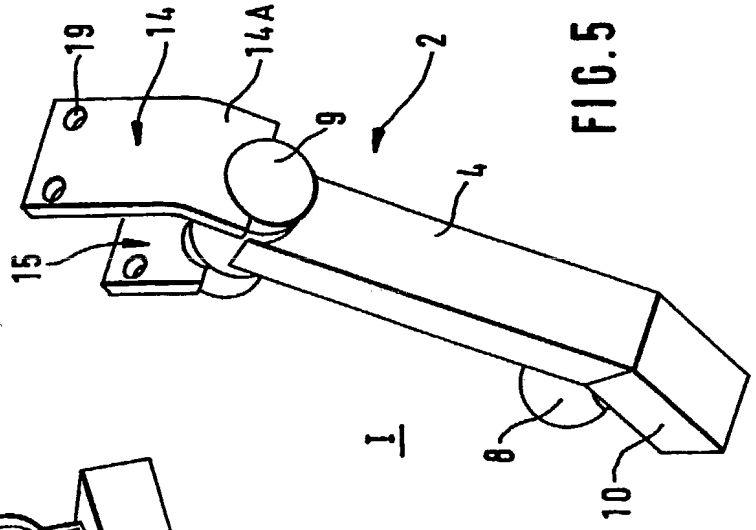

FIG.5

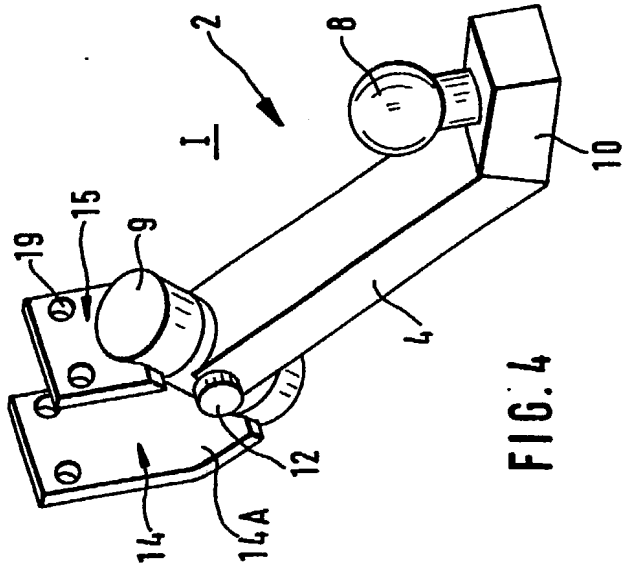

FIG.4

INTERNATIONAL SEARCH REPORT

International Application No PCT/SE 91/00237

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)[6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC5: B 60 D 1/54

II. FIELDS SEARCHED

Minimum Documentation Searched[7]

Classification System	Classification Symbols
IPC5	B 60 D

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched[8]

SE,DK,FI,NO classes as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]

Category *	Citation of Document,[11] with indication, where appropriate, of the relevant passages[12]	Relevant to Claim No.[13]
X	SE, B, 390144 (AB VOLVO) 6 December 1976, see the whole document	1-4,7-10
Y		5,6
A	EP, A1, 0288366 (AUTOMOBILES PEUGEOT & AUTOMOBILES CITROEN) 26 October 1988, see the whole document	1
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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
13th June 1991	1991 -06- 26
International Searching Authority	**Signature of Authorized Officer**
SWEDISH PATENT OFFICE	Hans Nordström

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ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO.PCT/SE 91/00237

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